APPENDIX E

EXAMPLES OF MANAGEMENT PRACTICES[1]

Non-Toxic Anti-Fouling Strategies for Boats. Copper-based paints are the most popular anti-fouling paints for boat hulls. These antifouling coatings slowly release copper into the water in their most toxic form to retard this growth and maintain a smooth surface on the hull. Copper can be released from the boat hull through land-based maintenance and sanding activities, underwater hull cleaning, and through passive leaching as described above. Laboratory experiments conducted by the Southern California Coastal Water Research Program (SCCWRP) in San Diego found that on a mass basis, ninety-five percent of the copper loading from recreational hull coatings occurs via passive leaching, as opposed to underwater hull cleaning.2

Boaters can help to address copper contamination in marinas by implementing non-toxic anti-fouling strategies. Marinas and boatyards can help by educating boaters on these alternative strategies. Non-toxic anti-fouling strategies involve combining the use of non-toxic or less toxic bottom coatings with mechanical methods, such as frequent cleaning, and companion strategies.[3]

Currently available non-toxic bottom coatings include:

- Silicon-based
- Epoxy-based
- Water-based
- Polymer-based
- Epoxy and silicon based coatings do not adhere to residual copper-based paints, so existing layers of paint must be stripped first.

[1] These are examples only, and are not an exhaustive list of marina and recreational boating management practices. For more information, see *The California Clean Marina Toolkit: A Resource for Environmentally Sound Marina Management and Operation.* California Coastal Commission Boating Clean and Green Campaign. 2004.
AND
U.S. Environmental Protection Agency (USEPA). 2001. *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating.* Nonpoint Source Control Branch, Office of Wetlands, Oceans and Watersheds, Office of Water, U.S. Environmental Protection Agency. November 2001.

[2] Schiff, Kenneth C., Dario Diehl, and Aldis Valkirs. 2003. *Copper Emissions from Antifouling Paint on Recreational Vessels.* Technical Report 405. Southern California Coastal Water Research Project. June 2003; and SDRWQCB. 2003. DRAFT Basin Plan Amendment and Technical Report for Dissolved Copper in the Shelter Island Yacht Basin. California Regional Water Quality Control Board, San Diego Region. January 31, 2003

[3] Taylor-Johnson, Leigh and Jamie Anne Miller. 2002. *What You Need to Know about Non-Toxic Anti-Fouling Strategies for Boats.* California Sea Grant/UC Cooperative Extension. Report No. T-049. AND
Taylor-Johnson, Leigh and Jamie Anne Miller. 2003. *Making Dollars and Sense of Nontoxic Antifouling Strategies for Boats.* California Sea Grant/UC Cooperative Extension. Report No. T-052.

Companion Strategies include:

- Frequent cleaning of hulls to remove early stages of growth before they harden[1]
- Using the vessel more often
- Using vessels at high speeds
- Storing vessels on land or hoisting them above water in the slips
- Surrounding vessels with plastic liners and adding 10-15% fresh water to reduce salinity
- Using an underwater hull cleaning dive service or a mechanical scrubbing system

Controlling Runoff from Parking Lots and Other Paved Areas[2]

- Place vegetated areas and filter strips to slow the flow of surface water and stabilize the shoreline
- Sweep and vacuum sweep parking lots regularly
- Design parking lots to reduce impervious land coverage and filter runoff before it reaches drainage areas and the Bay. Techniques include: utilizing crushed aggregate, porous asphalt, pervious concrete, or open-celled unit pavers for parking stalls; and creating "parking groves" with a grid of trees and bollards to delineate parking stalls.[3]

Controlling Runoff from Boat Maintenance Activities

- Find out if boat maintenance activities conducted at the marina require an industrial stormwater permit from the San Francisco Bay Regional Water Quality Control Board. Conditions in these permits require specific management practice to control polluted runoff.
- Avoid in-water cleaning of boats. If not feasible, wash boat hulls above the waterline by hand.
- Avoid in-water hull scraping. If not feasible, hire certified underwater hull cleaning dive service.
- Perform boat cleaning, maintenance, and repair work on shore in enclosed areas, either indoors or by using spray booths, or temporary plastic or tarp enclosures.

[1] Check with local boat maintenance yards for appropriate cleaning schedules for specific coatings. In San Diego, non-toxic coatings may need to be cleaned once every 2-2.5 weeks.

[2] See *The California Clean Marina Toolkit: A Resource for Environmentally Sound Marina Management and Operation*. California Coastal Commission Boating Clean and Green Campaign. 2004.
AND
U.S. Environmental Protection Agency (USEPA). 2001. *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating*. Nonpoint Source Control Branch, Office of Wetlands, Oceans and Watersheds, Office of Water, U.S. Environmental Protection Agency. November 2001.

[3] Bay Area Stormwater Management Agencies Association and Tom Richman & Associates. 1999. *Start at the Source: Design Guidance Manual for Stormwater Quality Protection*. Forbes Custom Publishing. New York.

- Clean maintenance areas immediately after maintenance activities take place, and properly dispose of debris
- Sweep or vacuum around maintenance areas frequently
- Capture pollutants from cleaning and maintenance activities with tarps and filter cloths
- Store chemicals and other hazardous materials in enclosed areas

Controlling Pollution from Landscaped Areas[1]

- Adopt integrated pest management practices (check with state or county agricultural extension office for information on particular pests)
- Use native plants that are disease and pest resistant, and will out-compete weeds (See BCDC's Bay shoreline landscape guide)
- Use pesticides only when all other options are exhausted
- Limit fertilizer use
- Design landscaping strategies that minimize water use (e.g. select drought resistant plants, mulch, build healthy well-drained soils to avoid excess runoff, use efficient water delivery system such as drip irrigation)

Clean Boating Education for Boaters

- Distribute clean-boating educational materials to boaters, through the marina office, newsletters, monthly bills, or other appropriate means
- For educational materials, contact the California Department of Boating and Waterways http://dbw.ca.gov/ 916-263-1331 and the Boating Clean and Green Campaign at http://www.coastal.ca.gov/ccbn/ccbndx.html 415-904-6905

[1] See *The California Clean Marina Toolkit: A Resource for Environmentally Sound Marina Management and Operation.* California Coastal Commission Boating Clean and Green Campaign. 2004.
AND
U.S. Environmental Protection Agency (USEPA). 2001. *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating.* Nonpoint Source Control Branch, Office of Wetlands, Oceans and Watersheds, Office of Water, U.S. Environmental Protection Agency. November 2001.